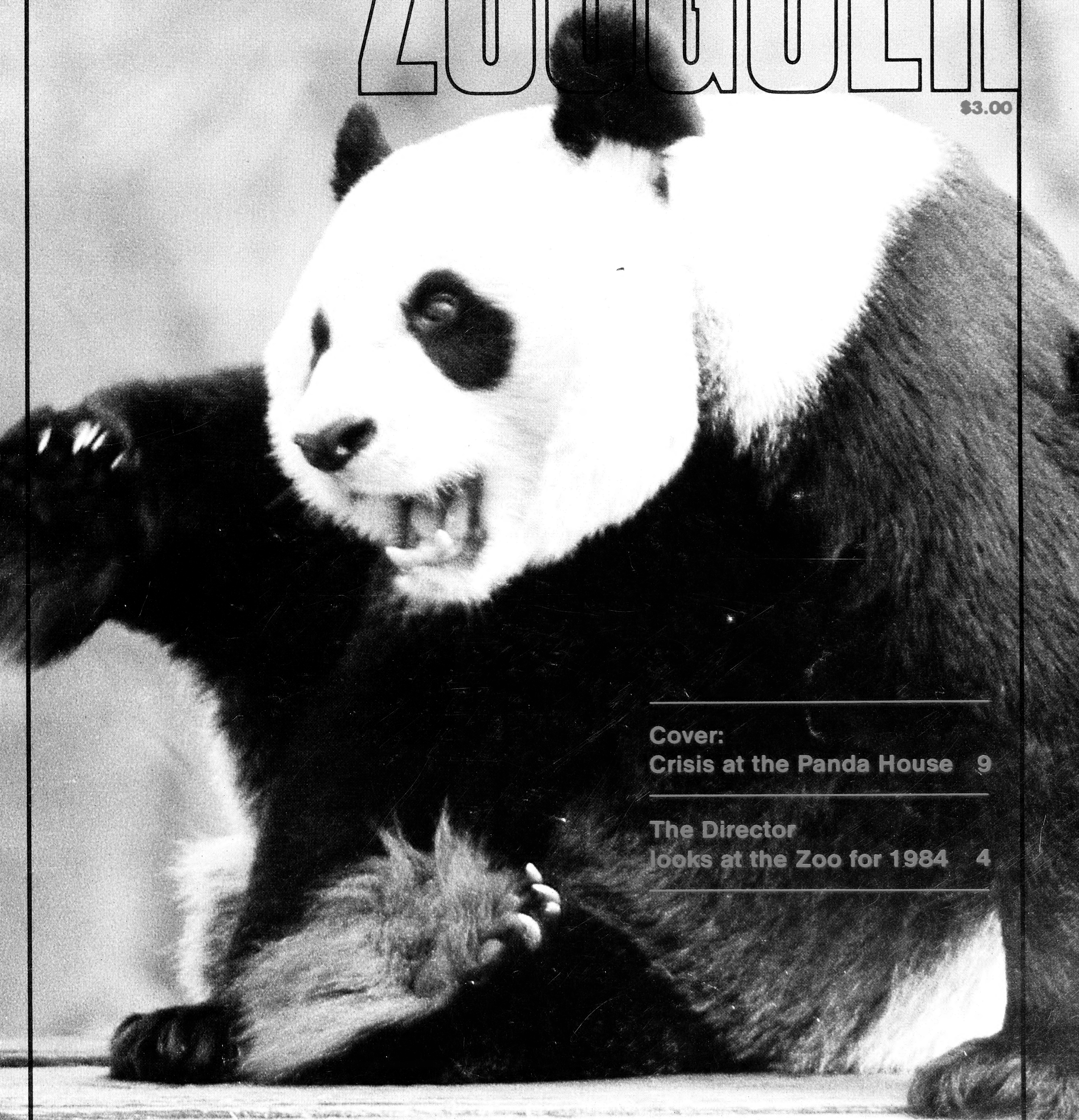


ZOOGOER

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ZOOGOER

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Front Cover

If there were an Animal of the Year for 1983, it would be the Zoo's Ling-Ling. Her successful breeding despite the loss of her cub last summer and her recent illness captured headlines around the world. Her medical crisis is detailed on page 9. Front and back cover photos by Jessie Cohen, NZP, Office of Graphics and Exhibits.

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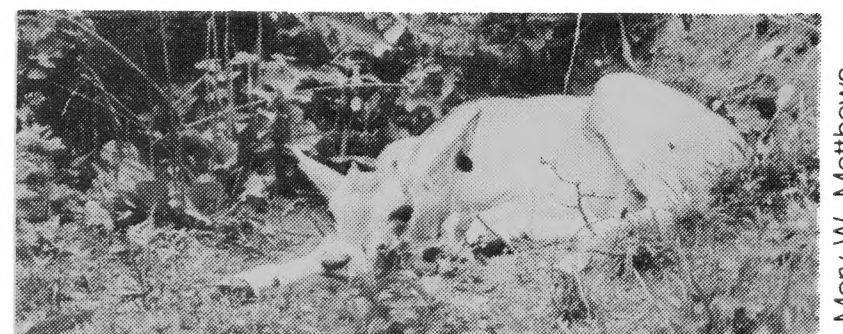
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NEW LOOK FOR ZOOGOER HERALDS MANY NEW, EXCITING ZOO PROGRAMS



Dear FONZ Member,

To ring in the New Year — and a new quarter-century of Zoo support — FONZ is introducing a newly-designed and expanded member publication.

The *ZooGoer* that you now hold has been enlarged to 8½ by 11 inches. To add visual impact and readability, the magazine has been dramatically redesigned by one of Washington's top designers, Roy Teller of *U.S. News and World Report*. An enthusiastic FONZ member, Mr. Teller generously contributed his time and talents — with his employer's support — to create this new look.

If your children have been receiving *PawPrints*, they will now receive that fun newsletter as a regular insert in *ZooGoer*.

The "new" *ZooGoer* is just one of several special member benefits coming up this year for you.

As President Bob Nelson reported at the annual meeting (see page 19), FONZ has enjoyed spectacular growth in its first 25 years. That has meant more programs for you . . . and dramatically increased support for crucial wildlife projects.

Upcoming months and years promise even greater things:

- An exciting array of new and expanded animal exhibits, plus a dramatic "greening up" of the Zoo's park-like atmosphere, are planned for the Olmsted Walk Project. Acting Zoo Director Christen Wemmer previews the "new look" on page 4.

- On four busy days next May, FONZ panda lovers will carry out the largest and most remarkable volunteer effort ever. You won't want to miss this great and fun event. See page 22 for details.

- Just a few days later on May 17, FONZ will hold its first National Zoofari. This unusual evening of cocktails, gourmet supper, music, dancing, and animal show-stoppers will fund an animal acquisition effort to bring such species as the golden monkey and the zebra duiker to the Zoo. If you'd like to have a fabulous evening and help the Zoo, be sure to read the announcement on page 22.

Clearly, FONZ is busier than ever serving you and saving wildlife. The array of new and expanded member benefits is our way of saying thanks — and Happy New Year!

Cordially,

A handwritten signature in dark ink, reading "Sabin Robbins". The script is fluid and cursive.

Sabin Robbins
Executive Director

"1984" at the Zoo

Dr. Christen Wemmer, Acting Director of the National Zoo

The year 1984 has been getting a great deal of attention from those looking for Orwellian predictions. Almost everywhere we turn, someone seems to be writing about the intrusion of institutions into our private lives, our loss of freedoms and how social obligations have replaced basic rights. Now that we are there, it seems important to know that in 1984, at the National Zoo . . . Big Brother is NOT watching you.

The National Zoo has long been committed to minimizing human intrusions so that visitors can enjoy a sense of unspoiled freedom. We try to offer a freedom to enjoy animals as they are in nature. We are not alone in this effort. Most modern zoos have emphasized the beauty of the natural world and its freedom from human interference. Moated naturalistic exhibits are a giant step in this direction and a small victory for populism.

The disappearance of the barred cage lets the visitor and the animal both enjoy their lives with a minimal reminder of captivity. The National Zoo intends to increase this optimistic emphasis on personal freedom and access to natural beauty in 1984 by improving the Zoo as a public park.

Much energy has been spent on improving our exhibits. The Zoo Master Plan, which began with the renovation of the old Lion House in 1973, is devoted to bringing animals and visitors closer to one another and to reducing intrusions such as bars, cages, and concrete walls.

The Small Mammal House is our most recent, and one of our most successful, efforts to date. This year all of the interior exhibits will be completed, and the visitor will be treated to a dazzling array of medium to tiny mammals. The animals are displayed in "jewel-box" settings designed to show off the interesting diversity of mammal life. Many of these creatures are seldom seen in zoos. Some are native to local woodlands.

For example, the least weasel is a native Virginian. On most days it can be seen roaming the miniature woodlands of its enclosure in search of food. Least weasels are rarely encountered, least of all in a zoo. To be able to closely observe the movements of this peculiar creature is a special experience.

One of my own favorites is the very unusual elephant shrew. These animals resemble large gerbils except that they have long and flexible noses. They live in forested or rocky areas of southern Africa and are active at sunrise and sunset. Only a few years ago it was almost impossible to see living elephant shrews in our country. They seemed to be delicate, high strung and difficult to keep alive. Our Department of Zoological Research developed a colony of elephant shrews for study purposes. One of the results of their effort was to work out the captive needs of this creature. We now have large numbers of these fascinating animals.

The Zoo is proud of its Small Mammal House. The animals are

active and interesting, and they can be easily seen by the visitor. The style of presentation allows for a direct and uncomplicated view of small mammals in naturalistic settings. It invites inspection by those who would like to wander through a gallery of animals as a form of art.

Scheduled for late 1984 is the first exhibit built as part of the "Olmsted Walk" project, named in honor of the Zoo's original landscape architect, the noted Frederick Law Olmsted. The Olmsted plan is in the final stages of design and includes new public entrances, expanded waterfowl ponds, a new gibbon island and penguin exhibit, and even more naturalistic plantings and pathways. The Olmsted Walk will be the main pathway through the Zoo and will extend from the Connecticut Avenue main gate to the waters of Rock Creek.

If all goes well, the Zoo will have several new exhibits including a large and long-awaited American bison exhibit near the Elephant House. The bison was the animal used to justify the construction of the National Zoo back in 1889. This species has not been exhibited for many years, and it is appropriate that it is a main feature of the new plan.

The Zoo's elephants look right at home in a leafy jungle even though Washington apartments rise close by. Exhibits that put wildlife in a wilderness setting are the goals of "greening up" plans for 1984.



Not all of the progress at the Zoo is seen by the visitor. This is especially true for our conservation efforts. The Zoo has determined that some of the most worthwhile programs in this field are those associated with the training of scientists in foreign lands.

Endangered species are best saved by the nations where those animals are found. The creation of a cadre of trained scientists committed to preserving their own wild habitats is of immense value.

The preservation of large and diverse habitats ultimately can save many if not most of the species found within them. Such efforts have been supported by FONZ funds for many years.

Dr. Rudy Rudran, a Zoo Research Associate, trains groups of foreign scientists each year. A six-week course is given at the Conservation and Research Center and at least two six-week courses are given in each of two foreign nations. Dr. Rudran teaches ex-

perienced scientists the field techniques used to study large vertebrates, especially primates. These scientists then use this knowledge to study and preserve their native wildlife.

Students trained by such efforts may participate in the release into the wild of 15 of our golden lion tamarins. Dr. Devra Kleiman, the project director, returned the animals to Brazil as part of a breeding, genetic management and potential reintroduction program.

The Monkey Island is a treat for monkeys and zoogoers because of the mix of waterfalls, pond, cliffs, trees, and greensward.



Jessie Cohen, NZP, Office of Graphics and Exhibits

For more than a decade the Zoo has been breeding and studying these severely endangered animals (there are fewer than 200 in the wild). The most modern genetic technology has been applied to their captive reproduction in an attempt to maintain the maximum amount of genetic diversity. The program has been so successful that a sufficient surplus of animals may be reintroduced back into a managed natural habitat. Again FONZ funds provide important

support.

Another significant program in our international conservation efforts is developing a permanent research and training facility in Nepal. A joint venture with the Smithsonian Tropical Research Institute, the facility will carry out research and train students in that wildlife-rich nation.

Finally, with FONZ support, genetic management techniques have strengthened endangered species programs at all zoos. By

studying the serum of zoo animals, our scientists can try to determine the diversity of genes represented in zoo populations. With this knowledge we have participated in the development of computer generated breeding combinations that should result in the most "natural" population possible. How ironic that the "Big Brother" technique of genetic management is expected to play a crucial role in the saving of wildlife. Welcome to 1984.

■

Penguins are coming to the National Zoo as part of the exciting plans for new Olmsted Walk exhibits.



Baltimore Zoo



Panda Crisis

Dr. Mitchell Bush / Dr. Richard Montali

Ling-Ling, the National Zoological Park's female giant panda who was a gift from the People's Republic of China, has presented the veterinary staff with various problems and challenges during her stay with us. Initially we worked with keepers and curators to modify her diet to control periodic intestinal upsets and her finicky habits of not eating for a day or two. Preventive medical procedures have included periodic treatment for intestinal round worms and yearly vaccinations against canine and feline distemper and rabies.

The most previously publicized work with Ling-Ling and her male counterpart, Hsing-Hsing, occurred when we attempted artificial insemination because of their past failures to breed naturally. The artificial insemination has unfortunately been unsuccessful to date. During these episodes we anesthetized Ling daily for up to three days in a row. In 1982 we performed a laparoscopic examination while she was under anesthesia, on the first and third days of her heat period. The laparoscope is a surgical telescope approximately 1/2" in diameter that is inserted through a tiny surgical incision into the abdominal cavity to allow viewing and manipulation of the internal organs.

Chief veterinarian Mitchell Bush collects blood from the anesthetized male panda, Hsing-Hsing, to be given to the very anemic Ling-Ling.

Another time of concern was during the 1981 breeding season when Ling and her English suiter, Chia-Chia, from the London Zoo had an intensive lovers' quarrel. Ling received some superficial injuries during that encounter and required about seven days of supportive treatment before returning to her normal self.

Then, earlier this year there was the elation that quickly vanished with the birth and rapid death of her cub. Following the pathologic diagnosis of an intrauterine bacterial infection that led to the cub's death, Ling-Ling was put on 10 days of intensive treatment with antibiotics. This was intended to treat any infection that might exist in her uterus and to prevent it from spreading and affecting her health. We also wanted to minimize damage that might occur to her reproductive organs and prevent her from becoming pregnant.

Ling-Ling was a fairly good patient but did not like getting antibiotic injections twice a day. We attempted to minimize the stress trauma of this procedure by using a blow pipe to inject the drug. The workings of the blow dart are illustrated in Figure 1. This method is less traumatic for the animal than other devices for remote drug treatment. Nevertheless, both Ling-Ling and we were relieved when the treatments were completed.

Since the loss of the cub, keepers and veterinarians have been watching her closely for any

signs of illness. Urine samples, which were collected from the floor, were monitored regularly for any abnormalities. We had tentatively scheduled a physical examination for mid-December to evaluate her general health and to examine her more closely for any signs of residual reproductive tract infection.

On November 25, 1983, the panda keepers reported seeing what appeared to be blood in Ling-Ling's urine. A sample was collected from the floor and sent to the Zoo's clinical pathology laboratory. The results of the urinalysis suggested a lower urinary tract infection. On November 26, Ling-Ling again began receiving injections of antibiotics via the blow gun. During the next three days Ling-Ling's urine improved and she had a very good appetite. But on December 1, she again had abnormal urine and her appetite decreased. Her condition remained static over the next four days. Although she was acting better, and it was not considered abnormal for her to miss a couple of meals, we decided it was time to give her a thorough medical examination. In her case this required general anesthesia. As with other dangerous zoo patients, anesthesia is required before most diagnostic procedures can be performed; however, anesthesia often can be a stress factor to an already sick patient requiring medical care.

The anesthesia was injected by blow dart. Once Ling-Ling was

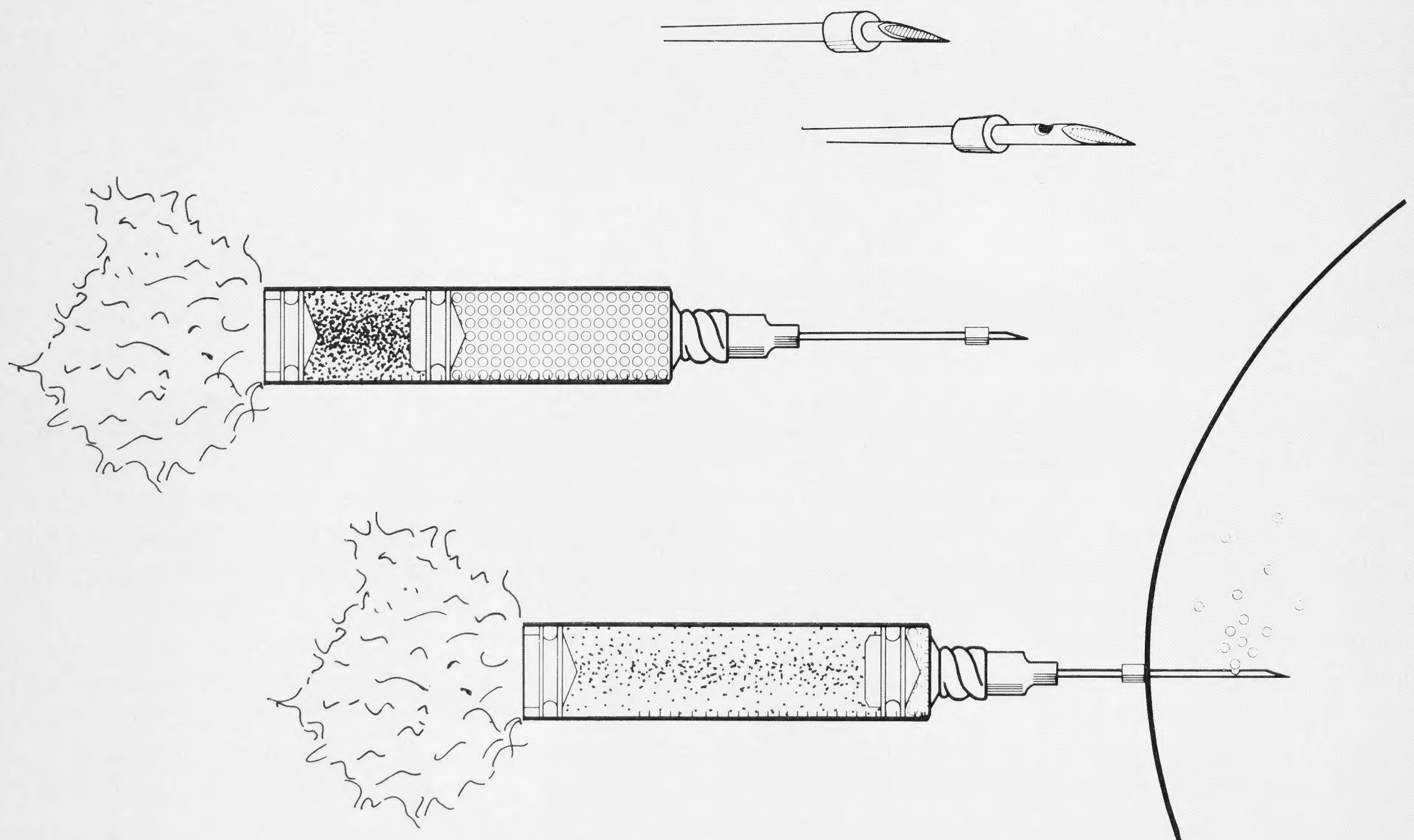
anesthetized, we began our evaluation, which included collecting blood and urine samples. On general physical examination, Ling-Ling seemed essentially normal except for a slight weight loss. Blood tests performed at the Panda House while she was under anesthesia showed that she was very anemic. The packed cell

volume (PCV), which measures the percent of the blood that is actual red blood cells, was 10%; the normal value for a giant panda is usually in the 40% range. We were surprised by this finding and immediately repeated the test; unfortunately the results were the same.

The next question was, "What

should we do?" An anemia this severe can be life threatening. At this point we were not sure whether or not Ling-Ling would even wake up from the anesthesia if something was not done immediately to help her. Time was short and the decision obvious: Hsing-Hsing would have to be a blood donor. The veterinary staff

FIG. 1



The key to the blow dart is a modified hypodermic needle that has the end glued shut and a small hole in the side of the needle near the end. This hole is covered by a tight fitting but movable sleeve. A plastic hypodermic syringe is modified so that it has one fixed and one movable plunger. The fixed plunger has yarn attached to it which aerodynamically aids the accuracy of the dart while in flight. Once the drug has been added and the needle is in place, liquid butane is injected be-

tween the two plungers by inserting a needle through the fixed plunger. The dart is placed in a pipe, aimed and then, with an explosive puff of air from the lungs, shot at the patient. As the needle penetrates the skin, the movable sleeve is pushed back and opens the hole in the side of the needle. Once this happens, the syringe is able to depressurize and the butane expands, pushing the movable plunger forward and injecting the drug through the side hole in the needle.

split into three groups: one group anesthetized Hsing-Hsing and collected blood to check his PCV to assure that he was not anemic and could safely donate blood; the second kept Ling-Ling under anesthesia, carefully monitoring her vital signs and giving supportive therapy including a large dose of antibiotics; the third group began STAT laboratory analyses which were vital to the medical decisions that had to be made in the next few minutes.

We checked Ling-Ling's white blood cell count to determine if there might be a concurrent infection present. The results indicated a slightly elevated, but not prohibitively high, white blood cell count. This was critical to the next decision for therapy. Incompatible blood transfusions are not common in animals during the initial transfusion, but they can occur with the second or subsequent transfusions. Since there was so little time and Hsing-Hsing was the only possible donor within several thousand miles (the closest other giant pandas are in Mexico City and London), we had to use his blood. To suppress any possible transfusion reaction or early destruction of his precious red cells by Ling-Ling's immune system, we gave her corticosteroids (cortisone) injections. Corticosteroids also help support an animal in shock but are contraindicated in the face of overwhelming infection. Rapid results from our laboratory showed an acceptable white blood cell count and allowed us to pre-medicate Ling-Ling a few minutes before she was given the two units of Hsing-Hsing's blood.

A bone marrow sample was then collected from Ling-Ling to better understand the nature of her anemia. The results of this were not encouraging, since examination of the bone marrow showed little

evidence that she was responding to the anemia.

As bad as the initial laboratory results were, the news worsened as our clinical laboratory, based at the Hospital and Research Building, rushed us more laboratory results which indicated she was very uremic, i.e. her kidneys were not removing the body's waste products efficiently. One of the tests that measures kidney function is the serum creatinine. Ling-Ling's value was 19.5, whereas the normal for giant pandas should be less than 1.5.

A most perplexing element of this case was that Ling-Ling did not look as sick as her blood tests indicated she was. We decided not to show her the results of the tests for fear that she *really would* be sick! It is common for zoo patients to mask the fact that they are ill; otherwise they could attract predators and be easier prey. The panda keepers began a 24-hour watch to monitor her activities. The temperature in her den and exhibit cage was raised about 10°, which we hoped would make her a bit more comfortable and help counteract the effects of the severe anemia. That night she did surprisingly well — ate a little and was fairly active. The next day, December 7, her urine appeared normal and we continued the antibiotics and corticosteroids by blow dart.

Now came the news conferences. There was national and international concern about our patient, and unfortunately we had only limited information to offer at that time. We attempted to portray the gravity of her problems as realistically as possible. At that time we felt the prognosis was very poor.

December 7th was also a day of data analysis of the many samples taken the previous day. Kidney specialists from both veterinary

and human medicine were consulted. A zoological veterinarian is a generalist who, when special problems require the expertise of a specialist, can integrate and apply suggestions to the patient. In this way our zoo patients are assured state of the art medical care.

The National Zoological Park is fortunate to be located in the greater Washington, DC area with access to many major medical centers. A productive ongoing collaboration has existed with the Children's Hospital National Medical Center for over five years. Therefore, this was one of the first, but not the only, facility we contacted for consultation. Since Ling-Ling's problems were related to her urinary tract, we consulted extensively with nephrologists at Children's Hospital.

The fraternity of zoos with giant pandas is small, and there has been excellent inter-zoo cooperation. We contacted the London Zoo and informed the staff of Ling-Ling's problems and sought ideas from their veterinary staff. A request was also made that if Ling-Ling needed more blood than Hsing-Hsing could provide, would they consider using their male as a blood donor. The answer was an immediate yes; Chia-Chia was ready to make amends! We said we would keep them informed and contact them if we needed more panda blood.

As more laboratory data were received and studied, it was decided to schedule more diagnostic procedures to better understand the nature of her kidney problem. Any rational treatment would be dependent on the cause of the uremia, and it was determined that a biopsy of the kidney would be necessary.

These more specialized diagnostic studies on Ling-Ling were scheduled for December 8. It was decided to be ready to use

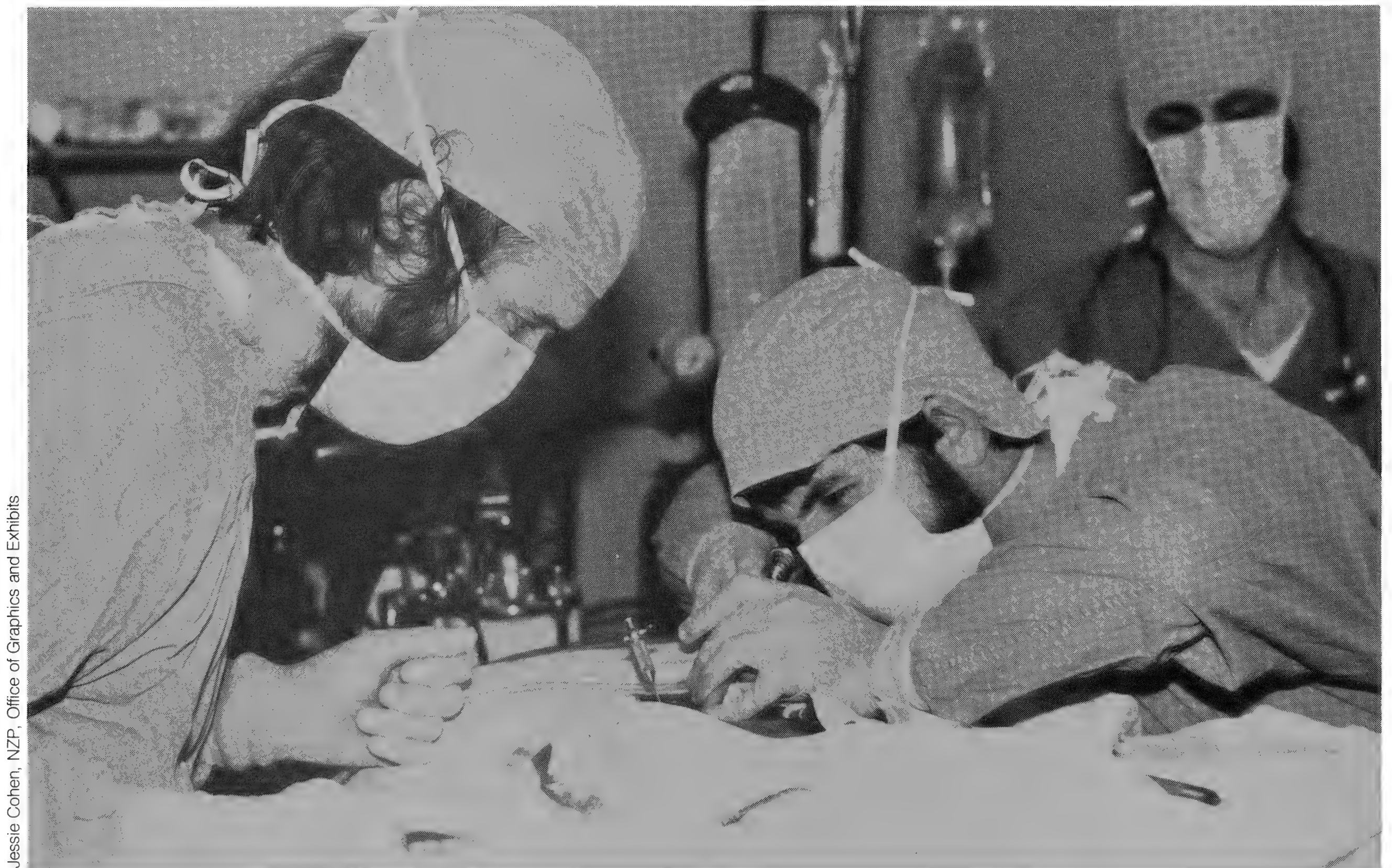
hemodialysis (the process of cleaning waste products from the blood, i.e. an artificial kidney) if there had been no improvement in her kidney function as indicated by the blood creatinine value. Dialysis was considered only as a short-term procedure, since it would be impractical and unfair to Ling-Ling to place her on long-term dialysis. We were hopeful that if we could reduce some of the stress on her kidneys, their function might improve. Since "end stage" diseases of the kidneys are relatively common findings in aging domestic carnivores, we were hoping that the biopsy would not show old scarred kidneys that had no chance of returning to function. A kidney transplant was not considered feasible because of the problems of having to suppress Ling-Ling's immune system in order to help the transplanted kidney to survive. Suppression of the immune system

can also lead to secondary infections that can be life threatening even to humans kept in a sanitary hospital environment, let alone a panda cage where scrupulous sanitation and surgical wound care would be very impractical and impossible to achieve.

In the late afternoon Ling-Ling was anesthetized and brought to the hospital. Once again our clinical pathology laboratory was ready to run STAT blood tests which would help direct our therapy and diagnostic procedures. The Veteran's Hospital, which often performs special tests beyond our laboratory's capabilities, was also alerted and graciously responded. The initial test results showed improvement. Ling-Ling was less uremic and her creatinine level was down from 19.5 to 8. It was decided that hemodialysis would not be necessary, a great relief, since that decreased the anesthesia

time that would have been required for the procedure. Next, the PCV was up from 10 to 14, which was an improvement and meant that her condition was not deteriorating. An ultrasound procedure was performed allowing us to visualize her right kidney, which appeared normal. Ling-Ling was then placed on gaseous anesthesia and a laparoscopic examination was performed. This was her third laparoscopy; the previous two were associated with the artificial insemination attempts in 1982 when we directly observed her ovaries. We again viewed her ovaries and uterus and found no major problems. A biopsy of the kidney was obtained, via the laparoscope, by directing the thin biopsy needle to the kidney. Also

By using a laparoscope, or miniature surgical telescope, Zoo doctors examine the panda's internal organs.



Jessie Cohen, NZP, Office of Graphics and Exhibits

during this time, blood and urine samples were collected for cultures and laboratory tests to further evaluate her status.

Ling-Ling recovered from anesthesia with no complications and was transported back to the Panda House. There was no reason to keep her in the hospital, and she would definitely feel better in her own home.

That evening the medical team waited for the results of the biopsy which was prepared by the technician in the Zoo's pathology department. Approximately three hours after the biopsy was obtained, it was ready for examination.

The diagnosis was pyelonephritis—a bacterial infection of the kidney tubules—which was about the best we could have hoped for. The biopsy also indicated that Ling-Ling's kidneys were not irreversibly damaged and had a good reserve for an animal of her age. Pyelonephritis was a condition that should respond to medical treatment!

Antibiotics directed specifically to the causative bacteria were administered by blow dart twice daily for the next four days. During that time she continued to improve both in activity and appetite.

On December 13 it was again time to anesthetize Ling-Ling to measure her progress. Although she appeared in good health, we wanted to know her exact status so that if changes in treatment were indicated we could start early. She was anesthetized as before with drugs in blow darts which caused her to sleep for about one hour. During this time we collected more samples and continued her treatment. Again, the blood results were encouraging; they indicated continued improvement. The blood creatinine level was now 3.7 and the PCV 15.5. Ling-Ling's antibiotic medication was changed

from injections to tablets on December 15. She received two tablets twice daily in sweet potatoes which she ate very well. All medication was stopped on December 24. Since that time she has remained alert, active and has eaten well. On December 27 Ling-Ling again was placed under anesthesia for about one hour for another update on her status. The laboratory results were again very encouraging. By then her creatinine had returned to normal and her PCV was up to 24—not normal yet, but significantly improved. A bone marrow sample showed that she was now responding well to the anemia by producing new red blood cells.

At this time we feel Ling-Ling has made a good recovery from her illness. We are still not sure of all the reasons that led to the pyelonephritis. We are therefore concerned with the possibility of a

recurrence. Studies are continuing on various specimens that were collected during both her illness and recovery period. Ling-Ling will be re-examined periodically to assure that she remains healthy, particularly in view of the upcoming 1984 breeding season.

During her illness the Zoo received many calls and letters. There were hundreds of get well cards, many with suggestions for treating our famous patient. The veterinary staff had some difficulty following the medical rationale of some of these suggestions, but almost all of them were sent by sincere and concerned panda lovers. It is in that spirit that we gratefully acknowledge all of these suggestions.

A surgical biopsy of Ling-Ling's kidney is obtained by using the laparoscope to look at the organ.



Jessie Cohen, NZP, Office of Graphics and Exhibits

Creating the Wild in Washington

Steve Frank

The National Zoo's 2400 residents include vegetarians, meat-eaters, insect-eaters, climbers, swimmers, diggers, burrowers, night hunters, and migrants.

The diversity of nearly 400 species poses a real challenge to the Zoo when it comes to designing attractive and functional exhibits within a budget. But animals thrive and visitors learn so much more when exhibits reflect the species' natural habitat and encourage normal activities.

Zoo designers know that some animals, like gorillas, do better in family groups while others, like giant pandas, need to be alone. It was the Zoo's researchers who discovered that bald eagles will breed when they're alone in their large cage but not when other birds are present.

Some animals live in harems, so separate quarters must be provided for the surplus mature males, which in the wild would leave the group. Or a second herd may be started, like the herd of dorcas gazelles sharing space with the bongos.

Climatically, the Zoo's animals range from those preferring wintry conditions, like the polar bears, seals and pandas, to those that like a tropical environment, such as apes, elephants and parrots. Most animals can do well in Washington weather if they're given time to adjust and if indoor quarters are made available to them. Decisions must be made about whether such adaptation is desirable.

Even moisture can be important. Animals like the marmosets and some reptiles prefer a steamy jungle, while the fennec foxes and a number of lizards need dry conditions. Moisture can be added or removed in a closed exhibit by changing plants and water pools, by adjusting air flow and by other mechanical means.

Some animal needs, such as dietary requirements, are more easily satisfied than others. Feeding is often done off-exhibit for greater control, but food is scattered in the enclosures in the Great Ape House and on Monkey Island to stimulate foraging and encourage activity.

Other needs, like migration, can never be met in captivity, but the urge to migrate is reduced when food is readily available.

All of these factors—plus the keepers' activities and the equipment they use to meet the animals' needs—affect the planning and building of exhibits.

Zoo designers seek a balance between simulating the natural environment and maintaining a clean and disease-free enclosure. Concrete floors in the Great Ape and Monkey Houses facilitate frequent, thorough cleaning. Perches in the aviary keep beaks and claws trim.

How Far Can a Macaque Jump?

When Zoo exhibits are built or renovated, animal characteristics take on special importance. Changes in exhibits are usually the result of years of careful, continu-

ing planning involving all Zoo departments.

For example, after the decision was made to build a "monkey island," the staff had to look carefully at the present and future needs of the animal collection to make sure the selection of Barbary macaques for exhibition was appropriate.

The standard government procedures for budgeting, getting approvals and contracting for an architect had to be completed before the staff could really discuss the details of the exhibit. The planning group included the Zoo's construction engineer, curator and keeper staff, plus representatives from the graphics, maintenance, public affairs, education and veterinary departments.

Rather than use imitation rock, called gunnite, the planners decided to go with natural rock, which requires less care. The rock was hand-picked by Zoo staff from a quarry in Berkeley, West Virginia.

The half-moat, half-dry approach breaks the tradition of full moats like the one at Lion-Tiger Hill, but it offers visitors a closer view of the animals while reducing space requirements.

How far can a Barbary macaque jump if it tries to leave the exhibit? The jump distance for this species could not be determined from the available literature. An educated guess was made of 20 feet horizontally and 12 feet vertically, and this factor was incorporated into the design.

A tree trunk hung by a wire over a pond provides a perfect mini-jungle setting for the Zoo's thriving tree boas.



A "hot wire" was put around the outside of the moat to give a mild shock to any macaque that swam across the water and tried to climb out. So far, not one has tried.

The design had to allow keepers to distribute food and the veterinarian to reach and remove animals needing treatment. Lighting, ventilation and access had to be planned for the underground holding cages and keeper work area.

Plus, there had to be enough room for each animal's flight distance, that minimum distance animals must maintain from each other (and from Zoo visitors) or they'll feel compelled to flee.

Even after the animals were moved in, questions remained. Would the evergreens be acceptable to the animals? Would the flowers survive to continue to brighten up the display? Would the sprinkler system, installed to water the plants from hidden outlets, prove sufficient and easily maintained? Could an ambitious macaque escape?

So far, all questions have been answered favorably. There will be a first-year evaluation of the exhibit, and then the emphasis will turn more toward long-term maintenance.

Design is a Balance

The Great Ape House also illustrates how Zoo design accommodates animals' needs, visitor interest and construction requirements.

Gorillas do well in extended families, and the house is designed to permit access to adjoining dens and the creation of a single, large connected area. Keepers have been putting the gorillas together under careful supervision with the goal of creating a group.

Also, the orangutan family (father, mother, juvenile male, very young male and unrelated juvenile female) is put together on occasion.

The "trees" in the gorilla exhibits are made of concrete because the animals tore apart real trees and flexible fiberglass ones. The concrete trees are designed with limbs strategically planned especially for gorilla climbing.

Another aspect of Zoo design is deciding which animals to exhibit. When the Reptile and Small Mammal Houses were renovated, these animal collections were re-examined.

The Small Mammal House emphasizes active, social, diurnal (active during the day) animals so visitors can see lots of things happening. Of the 48 species represented, 40 are diurnal, so there is activity in nearly all the exhibits during the day.

The reptile and amphibian collection was modified in favor of taxonomic balance. The visitor sees representatives of all the major groups of reptiles and amphibians in the same proportion in which they occur in the wild.

Exhibits are designed to simulate, though not necessarily replicate, the important factors in the animal's natural habitat. In the Reptile House, the tree boas have a small but high enclosure with tree rootballs strung together on stainless steel wire and hung over a pool. This provides the important aspects of the boas' natural environment without creating a full-fledged jungle, and the snakes seem to be thriving.

The size of the enclosure and whether it is narrow or wide or deep can tell you a great deal about how the animal moves and about its flight distance. Generally, smaller animals have shorter flight distances and large animals have longer ones.

While the protection of the Zoo has reduced the flight distance for some animals, minimum distances, primarily from the Zoo visitors, are still necessary to reduce stress.

Practically speaking, though, some natural movement has to be controlled: Leopards and most of the Zoo's other big cats are kept in covered enclosures rather than moated areas because of their tremendous vertical and horizontal leaping ability.

Sometimes, special features provide insights. There is an extra cave in the cobra exhibit, used as a holding pen when the exhibit is cleaned. The cobra is accorded this special area because of its size, its active nature and its potential danger to keepers.

From the Viewer's Side

Public appeal is a key element in the design, the need to create an aesthetically pleasing exhibit with good opportunities for viewing.

Perches for birds and small mammals are placed to provide the best view for the visitor. Heat lamps for the occupants of the Reptile House to bask under are placed near the front of the exhibits.

The renovations in the Small Mammal House in particular demonstrate the appeal to aesthetics. Animal exhibits range from the very realistic depictions of environments to the surreal background of grays and blacks in the Geoffrey's cat exhibit suggesting nocturnal activity.

Extensive use of greenery adds both aesthetic appeal and natural feeling. Foliage native to the original habitats is used whenever possible.

A New View

Good exhibit design is good for everyone. The animals live comfortably, the keepers do their jobs efficiently and the visitors enjoy and learn from the displays. Bringing all these factors together is a challenge, something for Zoo visitors to think about and appreciate during visits.

Zoo News

A Network of Concern

Radio tracking is one of many techniques taught conservationists like Malaysia's Patrick Andau (left) by FONZ-supported Dr. Rudy Rudran in a world-wide effort to save wildlife.

Dr. Rudy Rudran is building an "international network of concern" among wildlife specialists through a training program supported by FONZ funds.

The students in this program are actually wildlife professionals from the developing countries of Asia, Africa and South America. They come from government agencies, universities and private organizations.

Wildlife conservation problems in developing countries are especially severe, because the growing human populations are demanding more and more land.

Dr. Rudran, a member of the National Zoo's research staff, trains the students to collect information on the ecology and behavior of animals and then apply this information to finding ways in which people and wild animals can co-exist.

"We're relating field observation to research methodology," says Rudran. "You could go into the field and see a herd of elephants and that would be it. But with this training, the students can learn to identify the herd, track it, and when they see it again and again, they can determine its home range."

"It's collecting and analyzing information systematically so you can make some sense out of the habitat requirements and lifestyle of a species. This understanding is lacking in many developing countries. It's extremely important for the conservation of wildlife."

Although the course begins with



Jessie Cohen, NZP, Office of Graphics and Exhibits

lectures, the focus is on field work. The students learn to use tools from the compass to the satellite map. They practice trapping, tranquilizing and marking animals for direct observation and radio tracking. They analyze and evaluate vegetation and other aspects of habitat, map home ranges and study behavior.

In addition to participating in the group learning sessions, students can also plan and carry out individual projects—they learn to figure out what needs to be studied as well as how to study it.

Since the summer of 1981, seven training courses of four to six weeks each have been held, with a total of 75 students attending. The summer session is held at the Zoo's Conservation and Research Center in Front Royal, Virginia.

During the winter, Rudran conducts the training in the host country. More students can be trained at less expense this way. Also, local animal problems can be used as actual study cases. In Sri Lanka, Rudran and some of his trainees studied the impact of agricultural extension on endangered species such as the elephant and leopard. Tailoring the training to the particular country's needs has also stimulated interest in wildlife conservation and management.

The course is physically challenging, says Rudran. "You can sit in a room and discuss censusing animal populations, but only if you go on out and apply the technique will you have a complete understanding of it." Taking this view, he hopes to show his students that dedication and hard work are necessary to helping wildlife.

The course also addresses the importance of working with people to ensure the success of wildlife conservation projects. The training session in Indonesia gained publicity when the nation's recently retired vice president joined a field

trip. The Indonesian government has now requested the Smithsonian Institution to set up wildlife research projects and additional training programs.

Rudran hopes to expand the course, particularly in the areas of public education and captive management. One of the things made possible by FONZ funding has been the addition of a second instructor for the summer sessions.

Since the summer of 1981, wildlife personnel from twelve countries have participated in the training programs, all working professionals who can put the training to immediate use. In 1984, Rudran will train students in Venezuela, Uganda and Malaysia, in addition to teaching the summer session at Front Royal. Peru, Nigeria and Sierra Leone are planned sites for 1985.



Jessie Cohen, NRP, Office of Graphics and Exhibits



Jessie Cohen, NRP, Office of Graphics and Exhibits

Whether demonstrating capture gun and immobilization techniques or tree-girth measuring, Dr. Rudran teaches skills essential to good conservation management.

President's Report

Robert Nelson, FONZ President

At the FONZ Annual Meeting last October, President Robert Nelson reported to members significant achievements in 1983, past dramatic growth, and exciting upcoming programs.

In 1983, FONZ turned 25 years young. Substantial changes have occurred since 1958 when our founding members responded to a deteriorating National Zoo by launching the Friends of the National Zoo. We began with a shoebox holding \$63, and a bold determination to save the National Zoo from becoming another run-down municipal menagerie.

The early years can be the toughest. For FONZ, it meant that even after six years, the Treasurer reported to the Board a checking account balance of \$22.14, and petty cash of \$7.51. There were just 300 members.

It was ten years before FONZ education programs swung into action with 17 volunteers offering guided tours to arriving school groups. The first FONZ Education Office was the tailgate of a station wagon parked in a Zoo lot.

FONZ has come a dramatically long way since those early years. Today, FONZ generates revenues of more than \$4½ million dollars annually. We provide year-round special activities for more than 50,000 members, and we train and schedule more than 500 volunteers who staff a dozen different educational programs that reach tens

of thousands of Zoo visitors.

Although the size and scope of FONZ's educational programs have grown spectacularly in recent years, what has not changed from the very beginning is our conviction that the role volunteers play in an organization is an important measure of how well that organization serves its community. By that measure, FONZ is serving the community in exceptional ways.

FONZ's contributions have been so remarkably successful that the Smithsonian highlighted our efforts in its official published history of volunteer programs. The Smithsonian said:

"At the National Zoo, FONZ maintains a veritable bestiary of volunteer programs. . . . Today attorneys, engineers, students, psychologists, clerks, and housewives constitute '*an extended staff*.' These auxiliary zoologists allow the professional behaviorists to conduct definitive rather than sample studies, and the benefits for science are incalculable.

"Originally, the FONZ volunteers were a small tightly knit group of near full-timers: wives and mothers mostly, who devoted four or five days a week to Zoo work. As the group grew, more people shared the work in smaller portions. But their numbers increased so that whole new programs could be pursued: Pilot Guides to lead groups of fourth-graders from Washington public schools; weekday Park Guides to lure people into informal study

sessions by ambling around the grounds with something odd in hand—an antler or a snake skin.

"With new numbers of volunteers, entirely new facilities could be opened: ZOOlab, BIRDlab, and HERPlab—attractions where visitors can handle specimens and learn about them. Not even counting the interns and various students who help out regularly for academic credit, FONZ volunteers have become *absolutely essential* to the Zoo's operation."

There is good reason why the Smithsonian considers FONZ volunteer programs so essential to the Zoo. During the past year, 537 volunteers gave an incredible 45,717 hours of their talented time. In fact, FONZ made zoological history when one of our volunteers participated in the first videotaping ever of the actual birth of a giant panda.

In its first year of operation 25 years ago, FONZ accomplished a minor miracle by raising \$4,500 to pay for a professionally prepared Master Plan for the National Zoo.

By 1976, FONZ could commit \$30,000 to support crucial research and conservation programs conducted by Zoo scientists. But in just seven years after that, FONZ has so increased its Zoo support that this year your organization was able to provide an all-time high of a third of a million dollars for wildlife studies.

In 1983, FONZ funded 35 undergraduates and graduate researchers who conducted intensive

studies on a variety of endangered species using everything from exotic clinical medicine to radio tracking and computer analysis.

For some years, FONZ supported the Zoo's breeding of rare golden lion tamarins. Now it appears that there is a good chance that these beautiful and nearly extinct monkeys will be returned to their Brazilian homeland to establish breeding populations. It could turn out to be one of the most successful reintroduction programs in the history of zoos.

Recognizing that effective conservation studies must reach far beyond the boundaries of the National Zoo, FONZ supported field research on marsupials in Australia, tropical birds in New Guinea, marmosets in Brazil, and monkeys in Sri Lanka.

The ever-expanding support that FONZ is able to give National Zoo conservation programs is possible, in large measure, because of your support through membership dues and contributions and because of revenue generated by our visitor service concessions.

When last year's Zoo visitors munched down 10,352 pounds of popcorn, swallowed 10,220 gallons of soft drinks, ate 150,000 hot dogs, and bought 69,874 Zoo T-shirts and 38,500 stuffed pandas, they were indirectly supporting our conservation efforts. In addition to generating more revenue than ever before, our visitor service management team worked hard to achieve increased efficiencies and service. We offered fresh-baked pizza at the Panda Cafe, introduced new mobile carts for better snack and souvenir service, and expanded facilities at Panda Plaza to better serve the visitor—and so generate additional dollars for wildlife conservation.

We are working hard on several exciting projects for the coming months. We are launching a Travel

Club to give our hundreds of members who have been on FONZ safaris an opportunity to get together several times a year for a reunion and to enjoy illustrated lectures on upcoming travel adventures.

On the evening of May 17, FONZ will sponsor its first dinner dance here at the Zoo. It will be called the National Zoofari, and we hope to delight 1,000 guests with cocktails, animal demonstrations, a gourmet supper, live music, and dancing. This fund-raising effort—which we hope will be an annual affair—will launch the Theodore Reed Animal Acquisition Fund to assure Zoo leadership in the studying, breeding, and saving of threatened wildlife.

The Animal Acquisition Fund will honor Dr. Reed, the longtime Director of the Zoo, who stepped down in 1983. It is particularly appropriate that this FONZ effort honors Dr. Reed because he was the Zoo Director who spoke so movingly about the plight of the National Zoo, triggering the founding of FONZ 25 years ago. Without his strong and continuing support, FONZ could not have succeeded.

A final major event planned for 1984 will be the building of new outdoor play structures for the giant pandas. In the largest single volunteer effort ever attempted by FONZ, hundreds of our members will be involved in a coordinated, weekend-long flurry of activity to prepare and assemble the exercise furniture.

As is apparent, 1983 was a year of substantial success for FONZ. We have come a long way in 25 years—and there is every promise that our future successes will continue at an accelerated pace.

Our accomplishments are obviously the work of many over many years. It has involved a talented FONZ permanent staff, an incredibly hard-working Board of Direc-

tors, the continuing support of National Zoo and Smithsonian professionals and, most importantly, the crucial contributions of you, our members, in the role of contributors and volunteers.

New Directors Elected

FONZ welcomes three new members to the Board of Directors. They were elected at the 1983 Annual Meeting in October.

Josephine T. Burman is Vice President and design consultant for Burman Properties, Inc. Mrs. Burman has been a FONZ volunteer guide for 13 years, and she now serves as a house guide at Lion-Tiger Hill and as a park guide.

George A. Didden, III, is a Senior Vice President of the National Capital Bank of Washington. He also serves as President of the District of Columbia Bankers Association. Mr. Didden has been active in such organizations as the American Cancer Society, United Way of Greater Washington, the Mayor's Commission for Cooperative Economic Development, and the Association for the Preservation of Historic Congressional Cemetery.

Kenneth R. Sparks is Executive Vice President of the Federal City Council, an association of 125 business, professional and civic leaders. The Council has played an important role in the development of the Metro, the D.C. Convention Center, and neighborhood rehabilitation. Mr. Sparks previously served as Assistant Director for Public Affairs at the U.S. Office of Economic Opportunity, Director for Special Studies at the U.S. Information Agency, and an adjunct professor teaching college communication courses.

Having a close encounter with a dragon-like lizard at ZooNight is just one of many wild happenings that have become part of FONZ's much-expanded member programs.



Jessie Cohen, NZP, Office of Graphics and Exhibits

FONZ News

NATIONAL ZOOFARI

FONZ is going on safari right at the National Zoo, and you're invited to come along!

Plan now to join us May 17 for an evening of cocktails, picnicking, music and dancing in the heart of the Zoo.

The proceeds from this special event will launch the Theodore H. Reed Animal Acquisition Fund, which will be used to bring new exotic and endangered species to the Zoo.

On National Zoofari night, you'll be served cocktails and a gourmet picnic dinner, while a live band entertains you. After dinner, you can see special animal demonstrations or just enjoy outdoor dancing.

Your attendance will help meet a critical need of the National Zoo, because the costs of acquiring exotic and endangered species have increased dramatically. These costs include purchase price, crate construction and shipping fees. There are also costs for special handling procedures and diets, quarantine requirements, veterinary services, exhibit preparation and staff escort for the animals to ensure their safe delivery.

If the species is endangered, its wild population must be studied to make sure that the removal of individual animals will not go against conservation goals. Wild-caught animals of endangered species are exhibited only as part

of an inter-zoo management plan for the overall benefit of the species.

Species the National Zoo would like to acquire with the new funding include Asiatic elephants and rhinoceroses, musk deer and zebra duikers. Other possibilities are golden monkeys and gorals, both from the People's Republic of China.

You can be part of this exciting effort while you enjoy your own private safari at the National Zoo. Plan now to join us for this gala evening.

To receive your personal invitation, call 673-4950 today.

PANDA FURNITURE

Have you volunteered for the biggest FONZ effort ever?

In four busy days this spring—May 10-13—FONZ members will build outdoor exercise structures for the Zoo's most famous animals,

the giant pandas. The volunteers will transport and prepare materials and tools, and actually put the wooden structures together!

Help is also needed with child care and to provide food for the work teams.

The Zoo believes these exercise structures will stimulate more natural behavior in Ling-Ling and Hsing-Hsing, like climbing and balancing. If a panda is born, the youngster would benefit. Also, the simple platforms in use for 11 years are wearing out.

Architect Robert Leathers, who has planned and supervised construction of children's playgrounds, designed the structures after extensive consultation with Zoo experts.

FONZ members are encouraged to join this effort. There are jobs for all ages. A complete list of volunteer jobs and needed materials to be donated are described in the latest *Wildlife Adventures* brochure. If you need another copy, please call 673-4960.



What's new at the Zoo?

Sunday Afternoons at the National Zoo

Place: Education Building (near the Connecticut Avenue entrance)

Time: 1:00 pm to 3:30 pm, winter Sundays

Cost: Free (Zoo parking \$3)

Phone: 673-4717

February 26, 1984 Flying Machines and Flying Animals

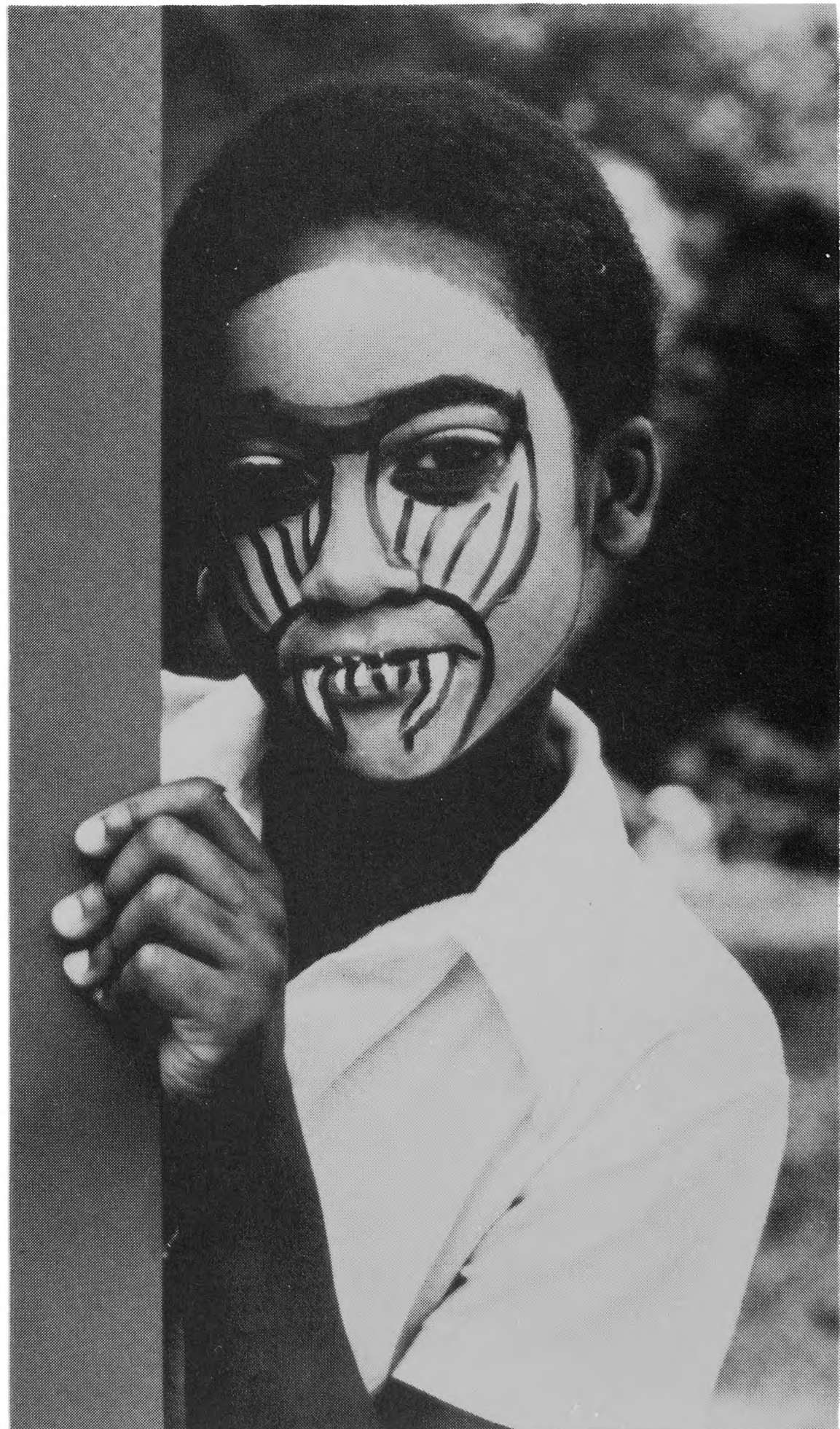
Join scientists from the Zoo and the National Air and Space Museum to learn about the structures and concepts of flight. Watch the film *Flight of the Gossamer Condor*, which is about the winner of the Kremer Prize for man-powered flight.

Free tickets are required at some events. Tickets are available on a first come, first served basis in the lobby of the Education Building on the morning of the program.



March 4, 1984 Face Painting

Let us paint your face to bring out the animal in you! Watch films that explore the purposes of patterns and colors in nature.



Jessie Cohen, N.Z.P. Office of Graphics and Exhibits

March 11, 1984 Snow Foolin'

Save this date for any program that is snowed out.

Modern-day Noahs, like Dr. Rudy Rudran, use radio telemetry in FONZ-supported projects.



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